

Unearthing an epidemic in “The Beautiful Land”

By Nancy Evans

On a clear April morning, you can see why the first Americans called it Iowa, meaning “the beautiful land.” Rolling green hills hold carefully tended farms where corn grows tall and horses and cattle graze to the music of meadowlarks. Small towns and a handful of large cities dot the landscape. Worlds away from urban decay, Iowa seems safe, an ideal place to raise healthy children. But a growing national epidemic threatens Iowa children: asthma.

Researchers at the University of Iowa estimate that 1 in 5 Iowa children suffer with asthma, prevalence rates nearly equal to the industrialized Northeast. Why? Their search for answers has created a major research center focused on childhood asthma at the University of Iowa. Four research projects are underway there to learn more about asthma. The largest project is a community-based study in a local rural county.

A disease of unknown causes

Asthma is a chronic breathing disorder whose symptoms include shortness of breath, wheezing, coughing and tightness in the chest. The disease is more serious in children because their airways are smaller and their lungs are still developing. Repeated exposure to environmental substances that irritate the airways causes irreversible scarring and inflammation.

Scientists are not sure what causes asthma to develop but research suggests that both genetics and environment play a role. A child whose mother has asthma is more likely to develop asthma than one whose mother does not have asthma. Mothers who smoke during pregnancy are more likely to have children with asthma. Viral infections

also may predispose a child to asthma, especially infections occurring during the first two years of life.

Response to a costly epidemic

Asthma affects an estimated 17 million Americans, 5 million of them children. The rates have been rising for 20 years. Asthma costs the US economy \$14.5 billion annually. Asthma is the most common chronic disease in children and the leading cause of school absences and childhood hospitalizations. Despite better treatments for asthma, mortality from the disease is also rising. Asthma kills 600 children each year.

The dramatic rise in childhood asthma and other environmentally related illnesses prompted a five-year federal initiative beginning in 1999 to learn more about these conditions and how to prevent them. The University of Iowa is one of 12 Centers for Children's Environmental Health funded by the National Institute of Environmental Health Sciences (NIEHS), the Centers for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA). Gary Hunninghake, MD, Director of Pulmonary Care in Occupational and Environmental Medicine, heads the center. "We're very concerned about the prevalence and severity of asthma, particularly among rural children in Iowa, and we want to see if we can have an impact on both those factors," he explains.

Asthma triggers

Scientists have identified a number of exposures that can trigger an asthma attack. These triggers include secondhand tobacco smoke, cockroach droppings, mold, dust mites, and furry animals. "If your child has asthma, the very worst exposure is

secondhand smoke,” Dr. Hunninghake explains. “It is almost impossible to control a child’s asthma if someone smokes in the home.”

Although cockroaches are more of an urban problem than a rural one, researchers have identified other triggers unique to rural settings, such as wood smoke, grain dust, and endotoxin, airborne particles of bacteria that irritate the airways. Grain dust reaches highest concentrations during harvest time but is ever present in farming areas and in small towns with grain elevators.

Transforming Iowa prairies into the fields and farms that feed America has saturated the heartland with agricultural chemicals for half a century. Some of these chemicals may also contribute to asthma. Dr. Hunninghake explains. “Whether these chemicals increase the overall severity of asthma, we’re not sure, but we’re quite certain that when they’re in the air and children breathe them, they can be quite bad for their asthma.”

Studying asthma in the community

Over the years, Iowans have learned the importance of research and readily participate in studies so researchers were not surprised when the first questionnaire in the community intervention study drew a 92 percent response. The study is designed to improve the control of childhood asthma in a rural setting by addressing both medical management and environmental triggers. Director Betsy Chrischilles, PhD, Professor of Epidemiology: “We’re working with families, the school district, the school nurse, health care providers, and lay counselors, focusing on improving the child’s indoor environment at home and at school. We have 300 families who have children with asthma, 150 of whom are receiving education and counseling about removing environmental triggers and

monitoring their child's medications and care. The other 150 families are the control group. At the end of three years, we'll see whether our interventions have made a difference in the health and quality of life for children with asthma."

Access to appropriate care is as critical in asthma management for Iowa children as for inner-city children. Where the community study is taking place, for example, there is no asthma specialist. One family practice physician serves the entire county. If a child has an acute attack, the child or the parents need to know how to manage it themselves or else drive a long distance to get care.

Unless adequately treated, asthma can lead to respiratory failure, a life-threatening situation. Yet many patients, both children and adults, and busy primary care practitioners tend to underestimate the severity of asthma until an emergency arises. The community intervention study is working to change that through patient and physician education based on National Asthma Guidelines. "Physicians need to classify the type of asthma as intermittent asthma or chronic persistent asthma because each requires different medications," pediatric pulmonologist Richard Ahrens, MD, explains. "The patient needs to learn self-monitoring and a quick relief plan. You can't cure asthma but you certainly can control it and make it a whole lot better in almost everybody."

Making life better for children and families affected by asthma is at the heart of the Iowa research. Ultimately the lessons learned in the heartland may help all children with asthma breathe easier.

Nancy Evans is a health science writer and filmmaker in San Francisco. She is co-producing a documentary series on children's environmental health: *Small Bodies of*

Evidence: The Toxic Lives of Children. Asthma is the focus of the series pilot, scheduled to air on KQED San Francisco early next spring.